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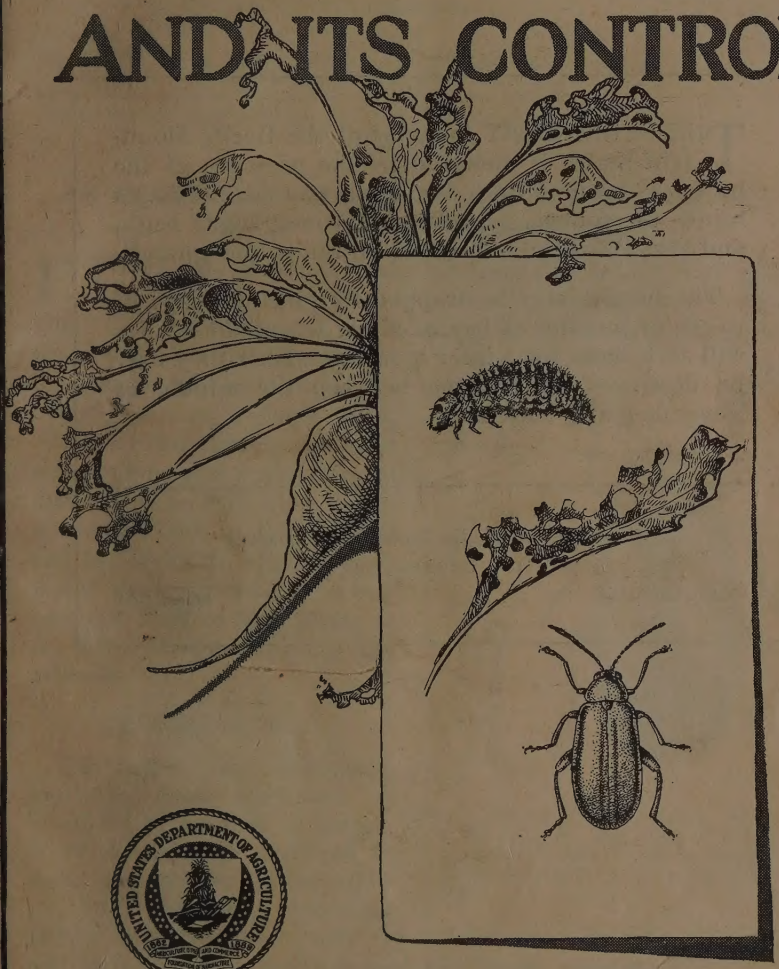
THE BEET LEAF-BEETLE AND ITS CONTROL



THE SUGAR-BEET industry of the Rocky Mountain States is menaced by the presence of the beet leaf-beetle. Both the larva and beetle stages injure the foliage, especially of young sugar beets, and also attack table beets of all kinds and spinach.

The beetles may be trapped by placing heaps of weeds or bundles of hay or straw where the beetles will seek them for winter quarters. Here they may be destroyed by burning between the middle of November and March.

Contribution from the Bureau of Entomology

L. O. HOWARD, Chief

Washington, D. C. March, 1921

THE BEET LEAF-BEETLE[1] AND ITS CONTROL.

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AN IMPORTANT ENEMY TO SUGAR BEETS IN THE ROCKY MOUNTAIN STATES.

IN THE Rocky Mountain States the sugar beet is subject to injury by a yellowish beetle known as the beet leaf-beetle or "alkali bug." The main injury is due to attack by the larvæ or young, but the beetles also inflict considerable damage, hundreds frequently being found on a single plant, which is either entirely consumed or so injured that it shrivels and dies. Prior to 1897, when injury was noted both in New Mexico and in Colorado, injury by this insect was unknown, it having confined itself to such plants as sea-blite, Russian thistle, and saltbush.

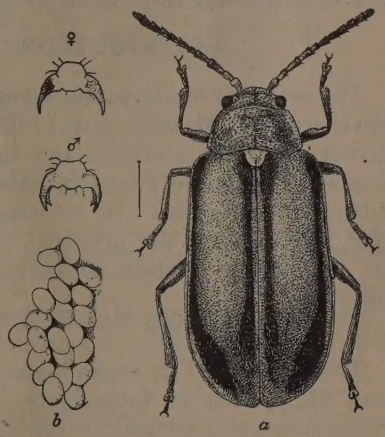

FIG. 1.—The beet leaf-beetle: *a*, Beetle; *b*, egg mass; ♀, claw of leg of female; ♂, ditto of male, *a*, Much enlarged; *b*, more enlarged; ♀, ♂, highly magnified.

DESCRIPTION.

The adult beet leaf-beetle measures from one-fourth to one-third of an inch in length, is of oblong form narrowed in front, and in color is pale yellow or buff, sometimes becoming smoky or nearly black, with the wing-covers yellowish or darker and more or less distinctly striped with black. (See fig. 1, *a*.)

[1] *Monoxia puncticollis* Say.; family Chrysomelidae, order Coleoptera.

The egg (fig. 1, *b*) is rounded, oval, pale orange-yellow when first laid, changing to dull brownish gray, convex above, flattened on the lower side where attached to a leaf, and the surface is minutely pitted. Eggs are deposited usually on end in irregular clusters, sometimes in layers, varying in number from 2 to 50 on either the upper or lower surface of leaves of beets and other food plants. The larva, when mature, is dark olive brown, spotted with pale yellow tubercles arranged in rows. (See fig. 2.) The head is shiny black, as are portions of the legs, which are rather long and slender. The length is about three-sixteenths of an inch.

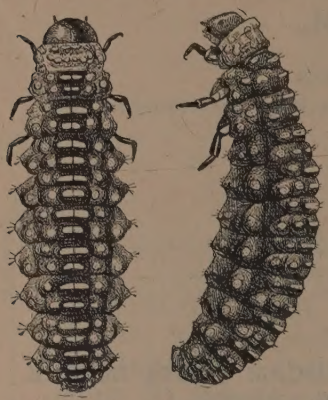

FIG. 2.—Beet leaf-beetle: Dorsal view of larva at left; profile view at right. Much enlarged.

The pupa (fig. 3) is nearly twice as long as wide, pale yellow, the head prominent, bent downward with the legs folded, as shown in the illustration. The length is from one-fourth to five-sixteenths of an inch.

DISTRIBUTION.

The beet leaf-beetle occurs along the Atlantic Seaboard from Massachusetts to Florida, in California near the seacoast,[2] and in the alkaline regions of Colorado, Utah, New Mexico, Arizona, Idaho, and Montana. In its eastern occurrence it is maritime and not injurious. It also occurs in portions of Kansas and Texas. See map (fig. 4).

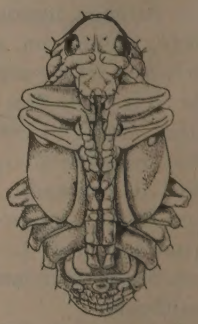

FIG. 3.—Beet leaf-beetle: Pupa much enlarged.

FOOD PLANTS.

The adults feed on sugar beets (figs. 5, A, B, and 6), garden or table beets, mangelwurzel, Swiss chard, and spinach; on lamb's-quarters (fig. 5, C), sea-blite (fig. 5, D), Russian thistle, saltwort, saltbush, sea-purslane, and pigweed.[3]

The larvæ are more restricted in their diet, feeding on sea-blite, lamb's-quarters, Russian thistle, and sugar beet only, so far as observed. Eggs are often deposited on other plants, but the larvæ have not been observed to develop on them.

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[2] The innoxious maritime forms occurring along the Atlantic and Pacific coasts may be distinct geographical races.

[3] *Amaranthus retroflexus*.

The beet leaf-beetle, under normal conditions, subsists upon the weeds mentioned, which grow in waste alkali soil, and as long as there is a supply of these plants sugar beets are little damaged. In the spring, before the weeds are abundant, overwintered beetles often infest small young beets, completely destroying them. Later the insects develop in such numbers on the weeds that the latter are killed. The insects then resort to sugar beets for food. Many hundreds of acres of beets are thus infested every year. (Fig. 6.) The beet leaf-beetle is injurious also because it acts as a carrier or distributor of the spores of the leaf-spot disease of beets.[4]

The beetles cut large, irregular holes through the leaves of the sugar beet and the larvæ do similar injury, eating pits in the leaves, frequently without cutting through.

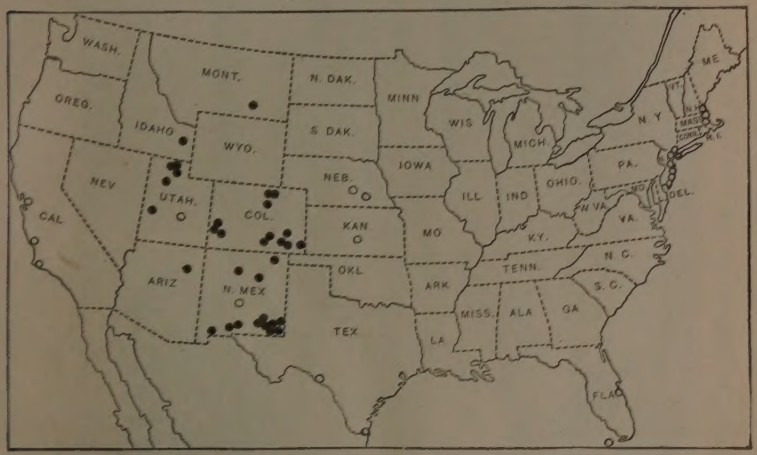

FIG. 4.—Map showing distribution of beet leaf-beetle. Large dots show injurious distribution; circles, innoxious localities.

When mature the larvæ leave the plants, burrow into the soil to a distance of half an inch or two inches, and form cells in which they transform to pupæ and then to adults.

LIFE HISTORY.

In the Arkansas Valley in Colorado and in regions having a similar temperature two generations or broods and a partial third brood are produced each year. The beetles pass the winter on the surface of the ground in alkali areas under tufts of grass, heaps of dead weeds, and other rubbish, a favorite location for this purpose being under tufts of "tickle grass,"[5] a habit which may be utilized to advantage in controlling the pest.

[4] *Cercospora beticola.*
[5] *Panicum capillare.*

The beetles issue from their winter quarters in March and April, feed, mate, and deposit their eggs. The first generation of beetles from these eggs, as observed in Colorado, appears late in May or

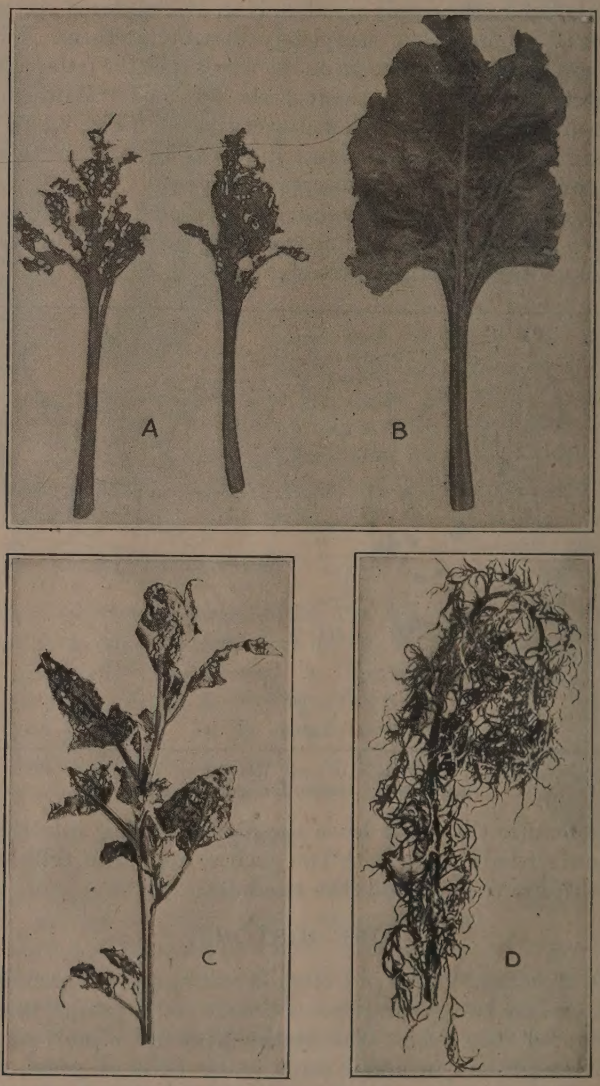

FIG. 5.—Food plants of beet leaf-beetle: *A*, Sugar-beet leaves riddled by beet leaf-beetle; *B*, a less injured leaf; *C*, lamb's-quarters killed by larvæ of beet leaf-beetle; *D*, sea-blite killed by same.

early in June, and the second generation becomes mature during the latter part of July. The eggs hatch in from 8 to 18 days, the larvæ

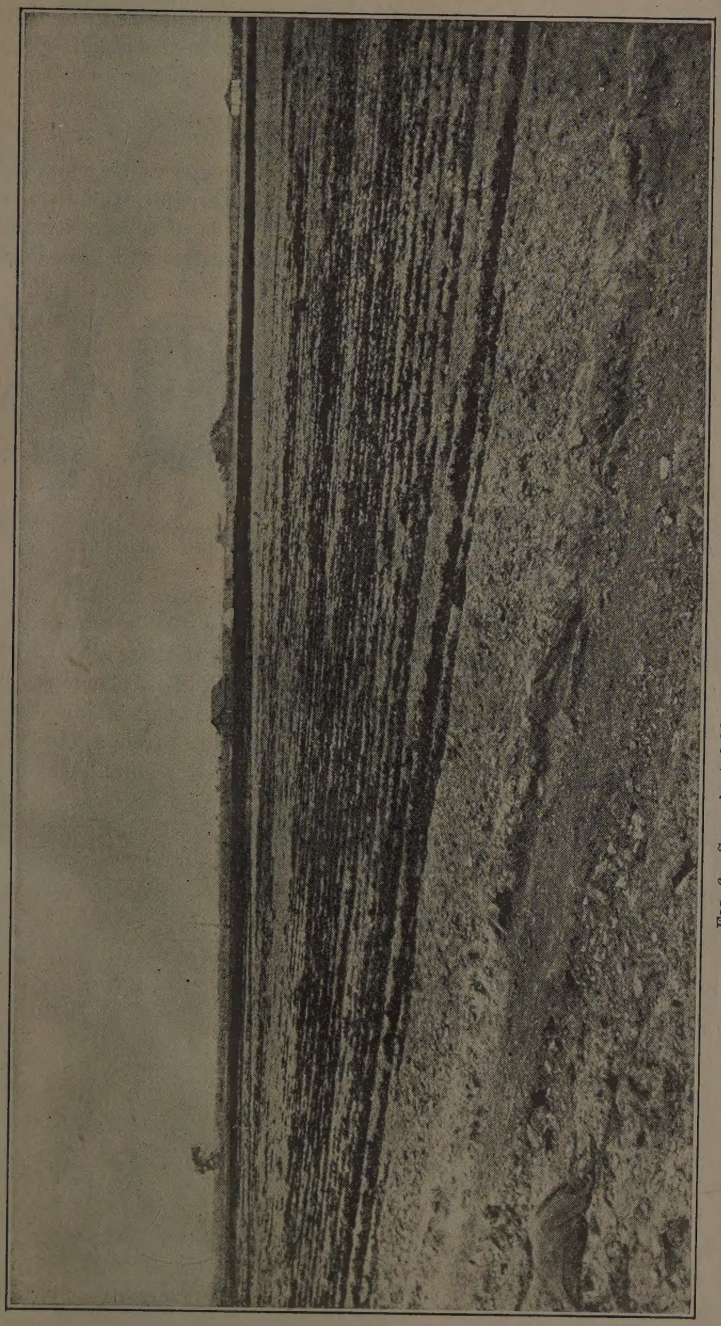

FIG. 6.—Sugar-beet field showing injury by beet leaf-beetle.

feeding for from three to four weeks before entering the ground to pupate. The pupa stage lasts 8 or 9 days. During September the beetles leave their food plants and go into winter quarters.

NATURAL ENEMIES.

Ladybird beetles of three species devour the eggs of this insect.[6] A bug[7] feeds on the larvæ and beetles. Mites and spiders also attack it, as does a fungous disease.[8] Wild birds of several species prey upon it and chickens feed readily on the beetles and have been utilized to advantage in destroying this leaf-beetle.

FIG. 8.—The convergent ladybird, an enemy of the beet leaf-beetle. Enlarged.

CONTROL MEASURES.

Taking advantage of the fact that the beetles pass the winter in alkali areas under tufts of grass, especially "tickle grass," dead weeds, and other rubbish, it is possible, by thoroughly burning these during the winter, to destroy the beetles in great numbers, as has been practically demonstrated. They may be trapped by placing heaps of weeds or bunches of straw or hay in these alkali areas which they frequent, and after they have gone into hibernation, the traps with the beetles are destroyed by burning. If this is done thoroughly, immense numbers may be destroyed, but careless, slipshod work will invariably fail to produce the desired result. The best time for this work is between the middle of November and the first week of March, when the dead grass and weeds may be easily burned.

Thorough tests with arsenicals and other insecticides have been made but without perfectly satisfactory results, neither dusting nor spraying being entirely effective.

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[6] The most useful are *Hippodamia convergens* Guer. (fig. 8), *H. sinuata* Muls., and *H. glacialis* Fab.

[7] *Perillus bioculatus* Fab., var. *claudus* Say.

[8] *Botrytis bassiana.*

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